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ABSTRACT

An instructor's manual and student activity guide on auto service repair are provided in this set of prevocational education materials which focuses on the vocational area of trade and industry. (This set of materials is one of ninety-two prevocational education sets arranged around a cluster of seven vocational offerings: agriculture, home economics, distributive education, health occupations, world of work, trade and industry, and office occupations.) The instructor's guide is organized into the following elements: title of activity, duration of activity (four to eight days), activity goals, instructional objectives (nine), related vocational clusters, and activity implementation (description, materials needed, safety considerations, teacher preparation prior to class, during the class, follow-up activities, and masters for duplication [a view fact sheet and a student checklist]). The student activity guide provides step-by-step instructions (narrative and illustrations) for completing each instructional objective (e.g., replace an air filter, replace wiper blades, check air pressure in tires, measure tire tread wear). At the end of each set of instructions is a student check point (evaluation activity). An occupational description for an automobile service station attendant concludes the document. (JH)

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ED169303

T & I
AUTO SERVICE REPAIR

Kit No. 14

INSTRUCTOR'S MANUAL

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1978

CE 020 488

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NATIONAL INSTITUTE OF EDUCATION

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TITLE OF ACTIVITY

Kit No. 14, T & I Auto Service Repair

DURATION

Main Activity – 3 to 5 days
Follow-up Activity – 1 to 3 days

GOALS

The student will understand the basics of auto service.

The student will learn to follow directions.

The student will be taught organization and procedures in auto service.

INSTRUCTIONAL OBJECTIVES

The student will replace an air filter.

The student will replace wiper blades.

The student will replace two radiator hoses.

The student will replace oil filter and take reading.

The student will replace fuse and tail light.

The student will check air pressure in tires.

The student will replace fan belt.

The student will measure tire tread wear.

The student will determine safe and unsafe tires.

VOCATIONAL CLUSTERS

Trade and Industry
Office Occupations

ACTIVITY IMPLEMENTATION

A. Activity Description

The class will be introduced to auto service. They will be taught to change an air filter, radiator hose, wiper blade, fan belt, oil filter, fuse, tail light, and to read tire pressure. From this experience, they will develop some understanding of auto mechanics and the job related activities of people employed in the field.

B. Safety

Do not abuse modules or tools.

C. Materials Required

1. Audio Visual Equipment
   None
2. Technical Equipment
   1 tire tread assembly
   2 tire-depth gages
   6 inner tubes
   1 pump
   2 air gages
   1 carburetor air filter assembly
   1 air filter
   1 oil assembly
   2 spin-on oil filters
   2 cartridge oil filters
   1 oil filter wrench
   1 - ¾" combination wrench
   1 tail light assembly
   1 Phillips screwdriver
   4 - 1129 bulbs
   4 - 1154 bulbs
   2 - 15 amp 3 AG fuses
   1 generator assembly
   1 - 3L470 V-belt
   1 - 7/16" wrench
   1 radiator assembly
   1 - 1/4" x 6" common screwdriver
   2 screw-type hose clamps
   1 - 11" flex hose (27.94 cm)
   1 - 17" flex hose (43.18 cm)
   1 wiper assembly
   1 trico wiper blade
   1 anco wiper blade

D. Preparation Prior To Class

Designate ten centers in room.

Center number one will cover replacing an air filter. The instructor will place the following equipment on table: air filter, air filter cover.

Center number two will cover replacing wiper blades. The instructor will place the following equipment on table: trico blade, anco blade, and blade module.

Center number three will cover replacing radiator hose. The instructor will place the following equipment on table: two radiator

hoses, two gear clamps, and screwdriver.

Center number four will be the oil dip stick reading station. One clean rag will be needed.

Center number five will cover replacing oil filter. The instructor will place the following equipment on the table: oil filter and oil filter module.

Center number six will cover replacing fuse and tail light. The instructor will place the following equipment on table: fuse and fuse module.

Center number seven is the tail light module and replacement bulbs.

Center number eight will cover air pressure in tires. The instructor will pump 6 different tire tubes to 6 different pressures and place the following equipment on table: air pressure gauge and 6 tire tubes.

Center number nine will cover replacing fan belt. The instructor will place the following equipment on table: fan belt, ½" wrench, and fan module.

Center number ten will cover measuring depths of a tire. The following equipment should be placed on table: a tire depth gage and tire tread module.

E. During Class Session

INTRODUCTION – Divide the class into ten groups. Each group will be assigned a center where there will be instructions on the table for each individual. These instructions come from the student guide.

Check for safety.

Walk around in class and observe the students.

Encourage pride in neatness and efficiency to students while doing the activity.

F. Follow-up Activities

1. Student is to fill out VIEW Fact Sheet.
2. Student is to cut out of newspaper five want ads about auto service repairpersons.
3. Student is to cut out of magazines five pictures of samples of auto servicing.
4. Student is to list five other auto services that are not in this activity.

MASTERS FOR DUPLICATION

VIEW Fact Sheet
Student Checklist

VIEW FACT SHEET

NAME _____ CLASS _____ OCCUPATION _____

A. List the advantages (good points) of this occupation (job).

B. List the disadvantages (bad points) of this occupation (job).

C. List three things you should know to do this occupation (job).
1.
2.
3.

D. What type of education should you get to be prepared (do) for this occupation (job)?

E. What courses must you take to go into this occupation (job)?

F. What do you think your future in this occupation (job) will be?

G. What wage can you expect in this occupation (job)?

H. What are the working hours of this occupation (job)?

I. To learn more about this occupation (job), write to:

J. Using a scale of 1 to 5, circle the number that measures your interest in this occupation (job) as a possible career.

I don't like it. ← 1 2 3 4 5 → I like it.

STUDENT CHECKLIST

	CHECK	DESCRIPTION
INSTRUCTIONAL OBJECTIVE I		Air filter
INSTRUCTIONAL OBJECTIVE II		Wiper blades
INSTRUCTIONAL OBJECTIVE III		Radiator hose
INSTRUCTIONAL OBJECTIVE IV		Oil dip stick
RECORD OIL LEVEL		Instructor check
INSTRUCTIONAL OBJECTIVE V		Oil filters
INSTRUCTIONAL OBJECTIVE VI		Fuse
INSTRUCTIONAL OBJECTIVE VII		Tail light
INSTRUCTIONAL OBJECTIVE VIII		Tire pressure
RECORD TIRE PRESSURES		A B C D E F
INSTRUCTIONAL OBJECTIVE IX		Fan belt
INSTRUCTIONAL OBJECTIVE X S = MEANS SAFE U= MEANS UNSAFE		Tire depth A B C D E F G H I J

T & I – AUTO SERVICE REPAIR

Kit No. 14

STUDENT
LEARNING ACTIVITY GUIDE

Prepared by

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INTRODUCTION

Your interest in automobiles could earn you a living either as a service station attendant or even as a manager of a service station. This activity will carry you through some of the tasks required to competently service a vehicle. You may find some of these activities may be applied to your family automobile in an effort to keep the vehicle safe and efficient. There may be parts of this activity when you may get your hands dirty. Please be careful when doing these activities. If you find yourself enjoying this activity, you may wish to follow-up by contacting your guidance counselor and inquiring into the possible vocational courses offered by your school district.

GOALS

1. The student will understand the basics of auto service.
2. The student will learn to follow directions.
3. The student will be taught organization and procedure in auto service.

DIRECTIONS

Your instructor will start you at a numbered objective. Proceed from step to step until you have completed every instructional objective. Follow the directions in your student guide, but do not write in it. Record all work on your student checksheet.

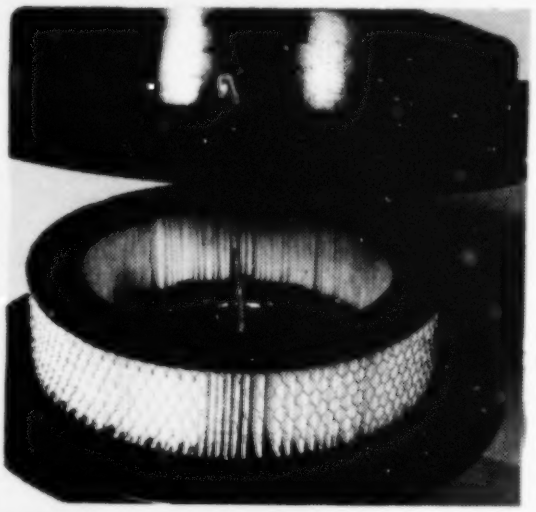
MATERIALS

Obtain a student checksheet from your instructor. The tools needed for measurement, assembly, and disassembly will be found by the particular objective.

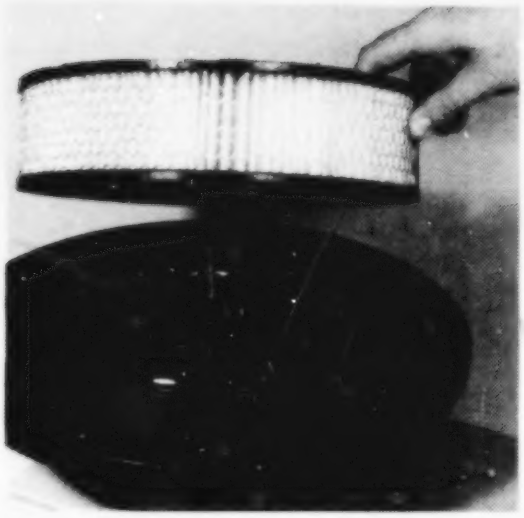
Instructional Objective 1

The student will replace air filter.

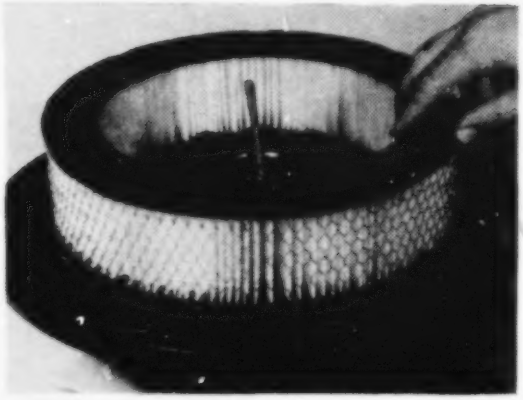
STEP 1 – Remove nut from air filter cover.



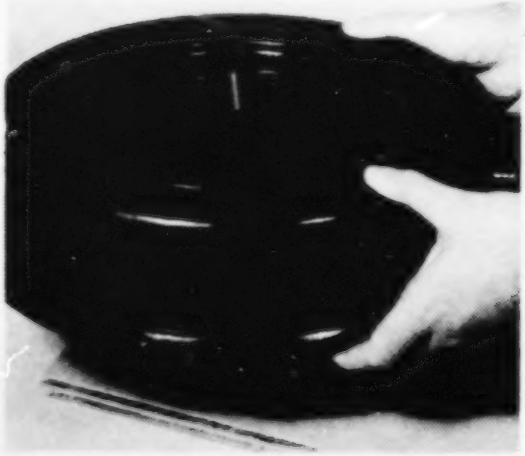
STEP 2 – Remove air filter cover.



STEP 3 – Remove old filter.



STEP 4 – Replace new filter.



STEP 5 – Replace air filter cover.

STEP 6 – Tighten nut back on air filter cover.

Check Point

Check to see if cover is in right position.
Check to see if nut is tight.
Have your instructor check your student work sheet by Instructional Objective I. Proceed to Instructional Objective II.

Instructional Objective II

Student will replace wiper blades.

STEP 1 – Identify trico blade.

STEP 2 – Squeeze the latch lock release

STEP 3 – Pull the element out of the lever jaws.

STEP 4 – Replace wiper blades by installing the blade through the yoke jaws.

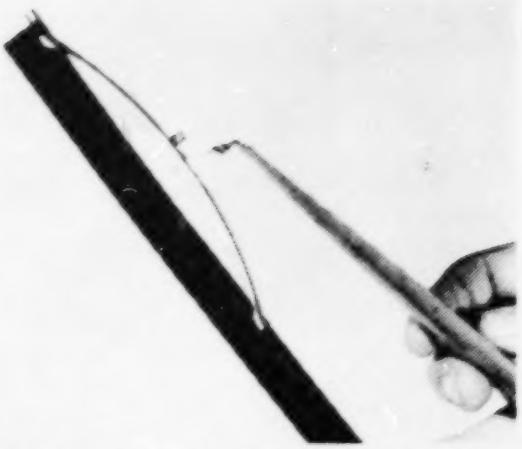
Check Point

Examine to see if you have the correct blade.

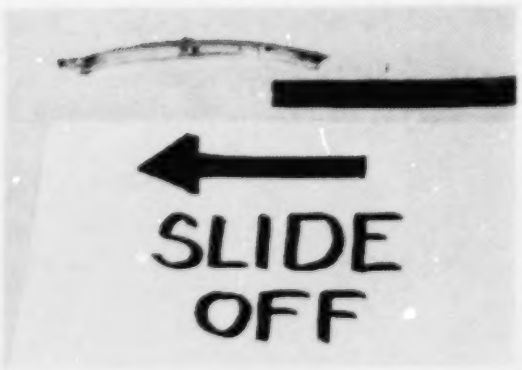
Check to see if the blades are engaged at all points.

STEP 5 – Identify anco blades.

STEP 6 – Depress the latch pin.



STEP 7 – Slide the element out of the yoke jaws.



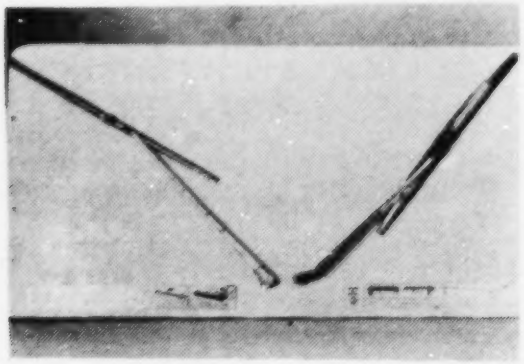
STEP 8 – Replace wiper blades by installing the blade through the yoke jaws.

Check Point

Examine to see if you have the correct blade.

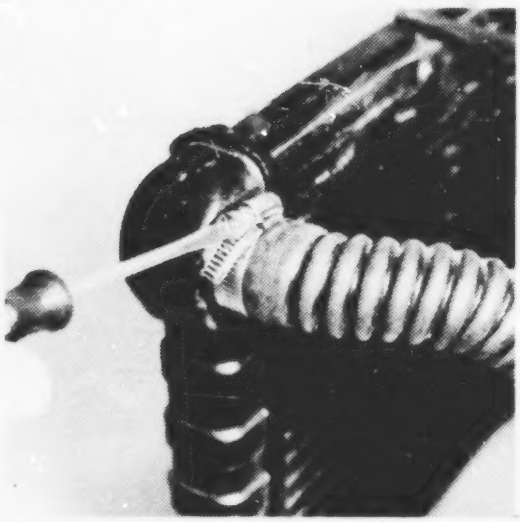
Check to see if the blades are engaged at all points.

Have your instructor check your student checklist and proceed to Objective III.

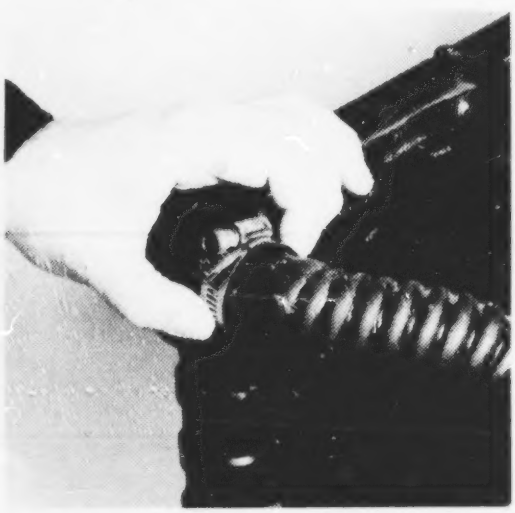


Instructional Objective III

Student will replace two radiator hoses, one preformed hose, and one flexible hose.

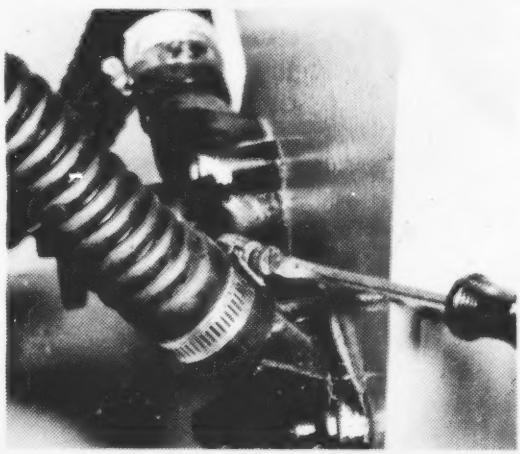


STEP 1 – Obtain a screwdriver and turn all screws on gear-type clamps that connect the top hoses from radiator to engine.



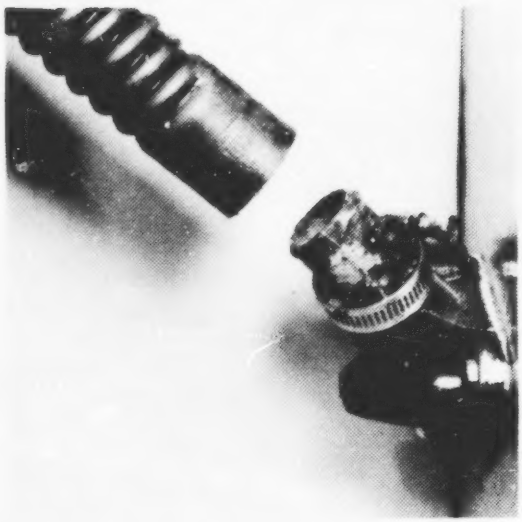
STEP 2 – Slide gear-type clamps off hoses on to radiator.

STEP 3 – Pull and twist hose from radiator.

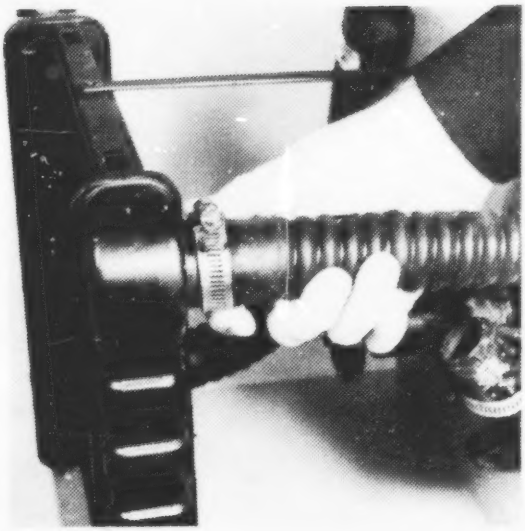


STEP 4 – Unscrew gear clamps from engine connections.

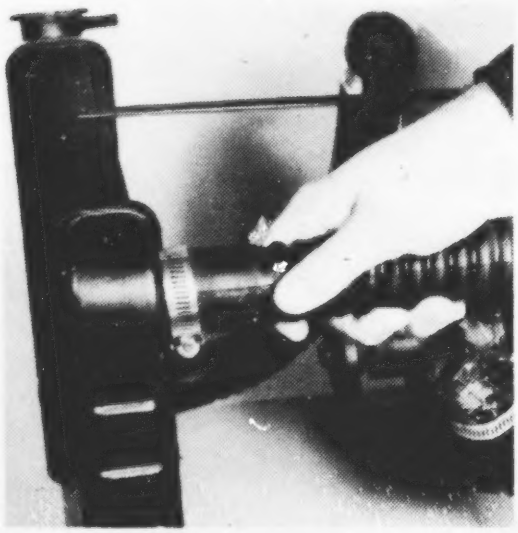
STEP 5 – Slide the gear clamps on the engine connections.



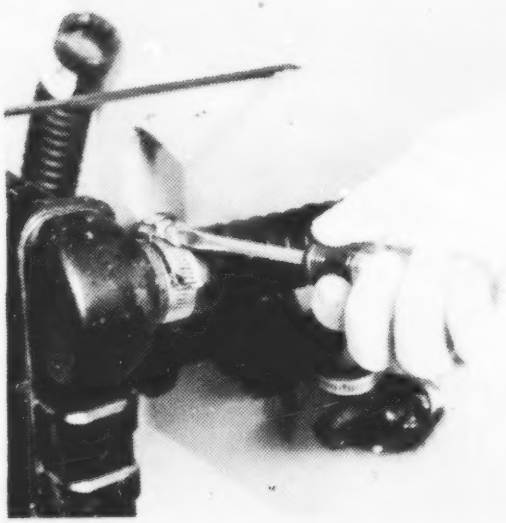
STEP 6 – Pull and twist hose from engine.



STEP 8 – Slide gear-type clamps on hoses from radiator.



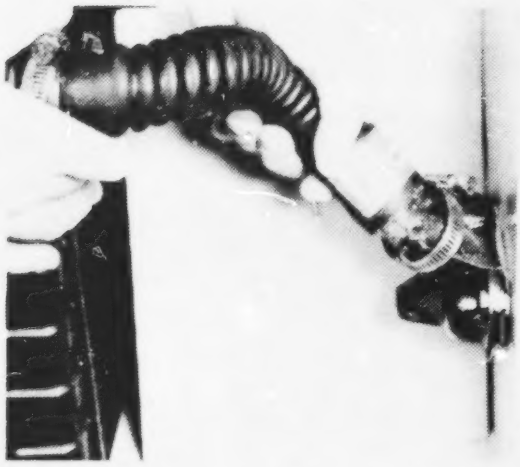
STEP 7 – Twist and push new hose on radiator.



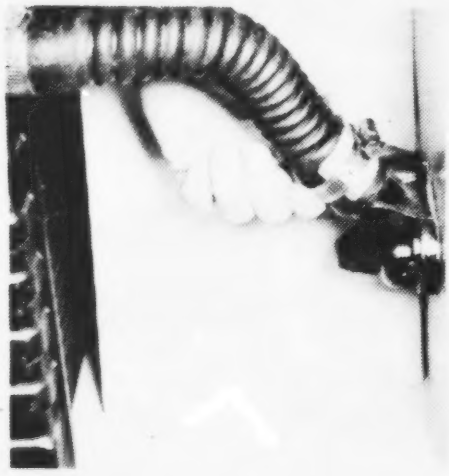
STEP 9 – Turn screw on gear-type clamps until the top hoses tighten on the radiator.

Check Point

Have instructor check your work sheet.



STEP 10 – Twist and push hoses on engine connections.

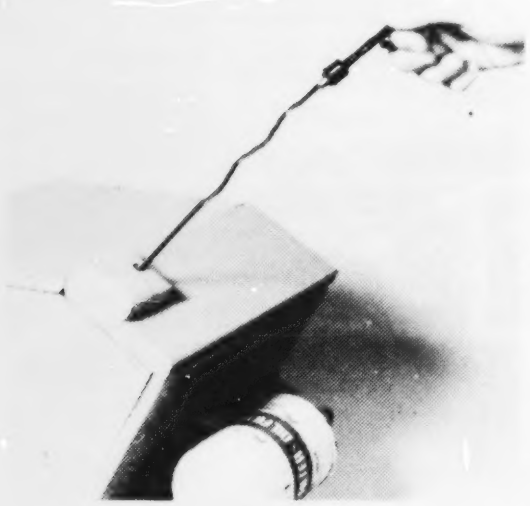


STEP 11 – Slide gear-type clamps on hoses from engine.

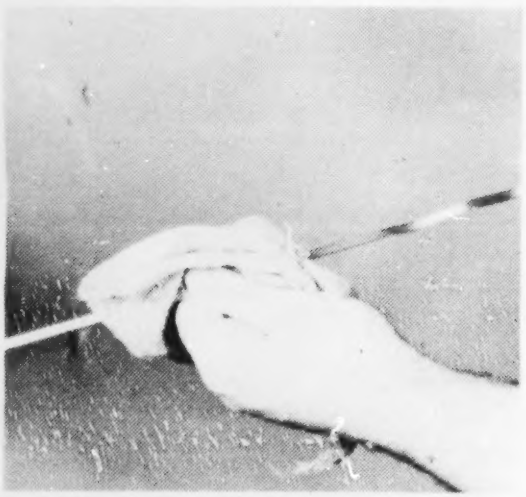
STEP 12 – Turn screw on gear-type clamps until the hoses tighten on the engine.

Instructional Objective IV

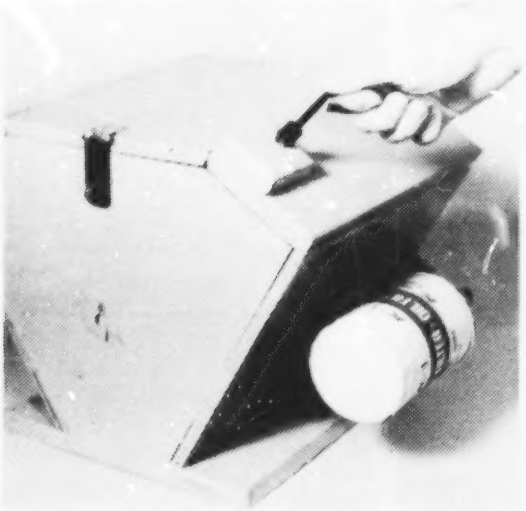
The student will read and record oil dip stick reading.



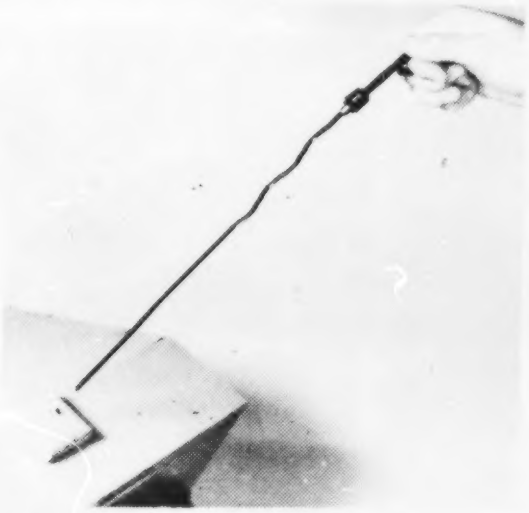
STEP 1 – Remove oil dip stick from module.



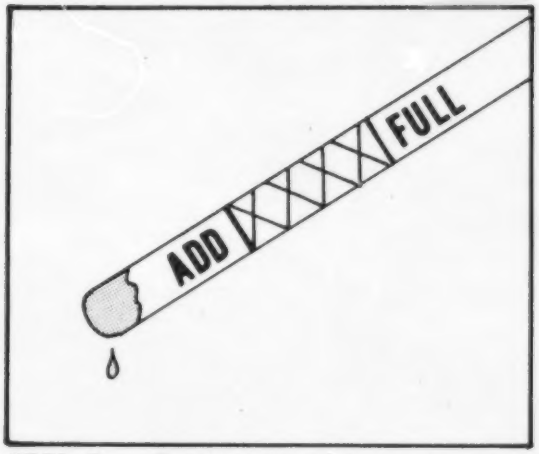
STEP 2 – With a rag wipe off all oil on stick.



STEP 3 – Replace oil dip stick in hole for one minute.



STEP 4 – Remove oil dip stick again.



STEP 5 – Read level of oil by the gauge printed on the stick.

1	CHANGE AIR FILTER
2	REPLACE WIPER BLADES
3	CHANGE RADIATOR
4	OIL ADD 1 QT.
5	CHANGE OIL FILTER
6	REPLACE FUSE
7	REPLACE BULBS

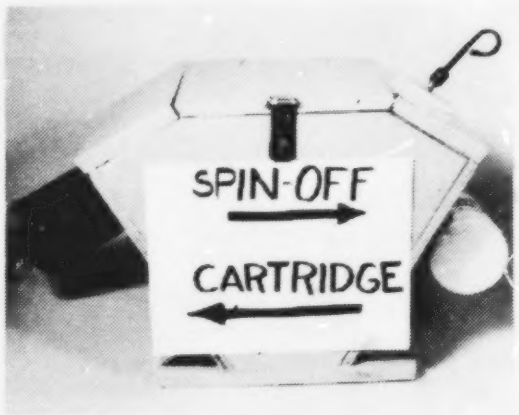
STEP 6 – Record your answer on your checksheet.

Check Point

Have instructor check your student checksheet.

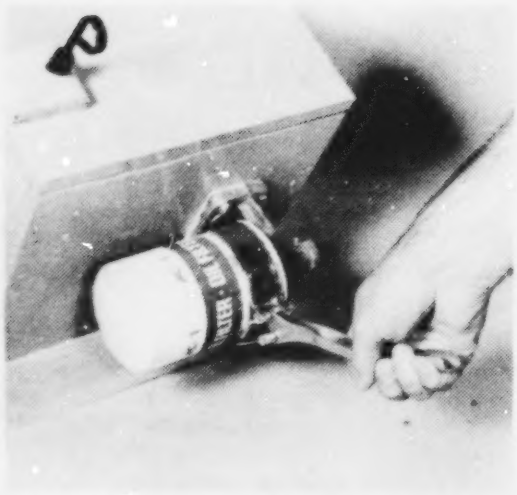
Instructional Objective V

The student will change 2 types of oil filters.

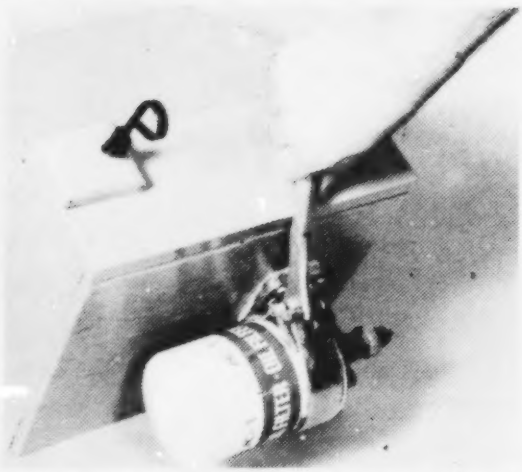


STEP 1 – There are two types of oil filters in the module. A spin-off filter and a cartridge filter.

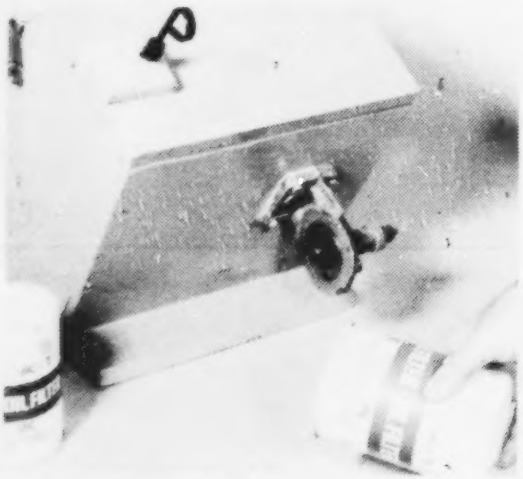
STEP 2 – Pick up spin-off wrench.



STEP 3 – Place wrench around filter.



STEP 4 – Remove filter by turning wrench counter-clockwise.

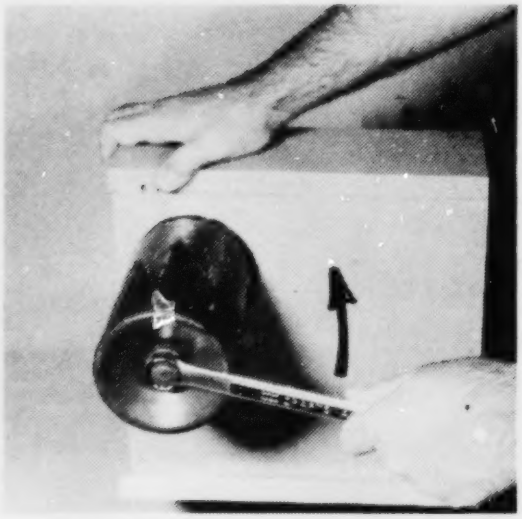


STEP 5 – Pick up new spin-off filter.

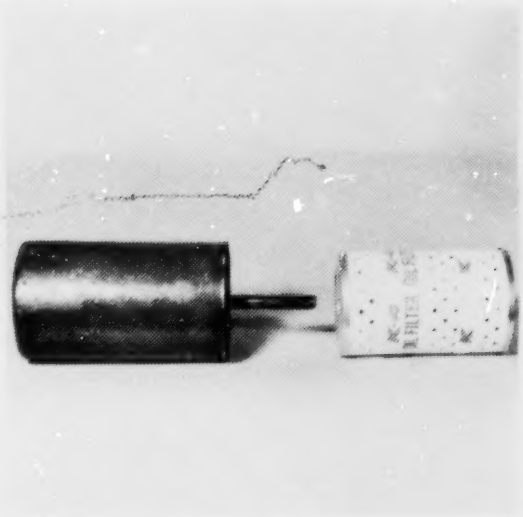
STEP 6 – By hand, turn filter clockwise until snug. Be careful not to cross thread filter. Do not over tighten.

STEP 7 – Pick up combination wrench.

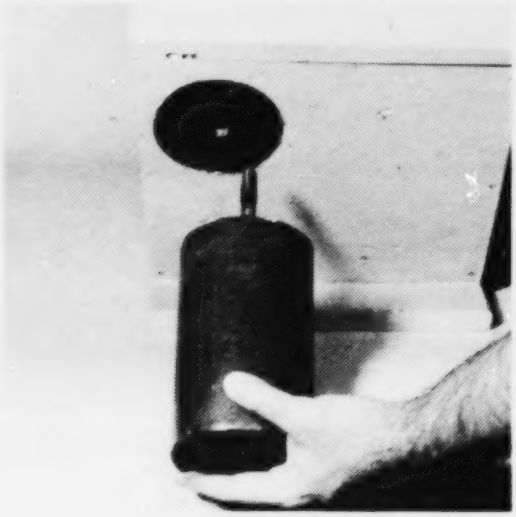
STEP 8 – Place wrench on top bolt of the cartridge filter.



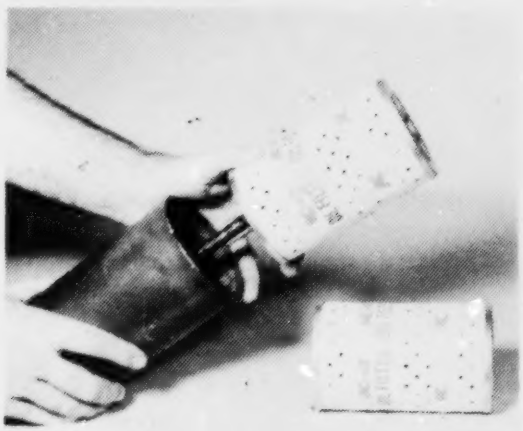
STEP 9 – Turn wrench counter-clockwise until the bolt is completely out of filter.



STEP 11 – Remove filter element.



STEP 10 – Remove metal cartridge case.



STEP 12 – Replace new filter element.

STEP 13 – Place metal case over element.

STEP 14 – By hand, start top bolt to secure filter.

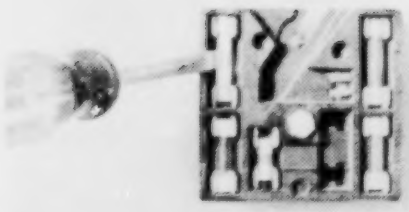
STEP 15 – Tighten bolt to fit snugly with wrench. Be careful not to over-tighten top bolt.

Check Point

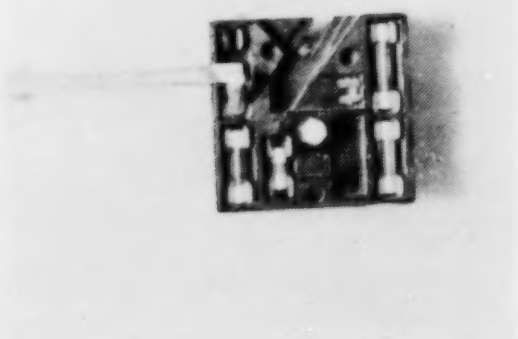
Have your instructor check your student checksheet by oil filter change.

Instructional Objective VI

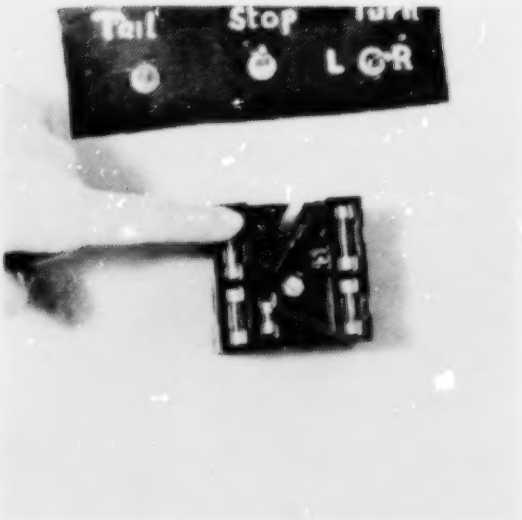
Student will replace fuse.



STEP 1 – Place screwdriver in the plastic groove and slide the blade behind the fuse.



STEP 2 – Gently press toward the board. This motion will free the fuse from the box.



STEP 3 – Replace with a new fuse by pushing it into the two prongs which secure the fuse to the box.

Check Point

Do not force the fuse in clamp.
Check for correct fuse.
Have your instructor check your checksheet.

Instructional Objective VII

The student will replace a tail light bulb.

STEP 1 – Remove the two (2) screws on each side of the lens with a Phillipshead screwdriver.

STEP 2 – Remove lens by pulling away from base.

STEP 3 – Press in on bulb and remove the tail light.

STEP 4 – Light bulbs will come out.

STEP 5 – Replace tail lights by putting bulbs into the sockets.

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Check Point

Have your instructor check your student checksheet.

STEP 6 – Twist bulbs into place.

STEP 7 – Replace lens on brace.

STEP 8 – Screw two (2) screws in original position.

Instructional Objective VIII

The student will check tire pressure and record his/her findings.

STEP 1 – Pick up tire pressure gauge.

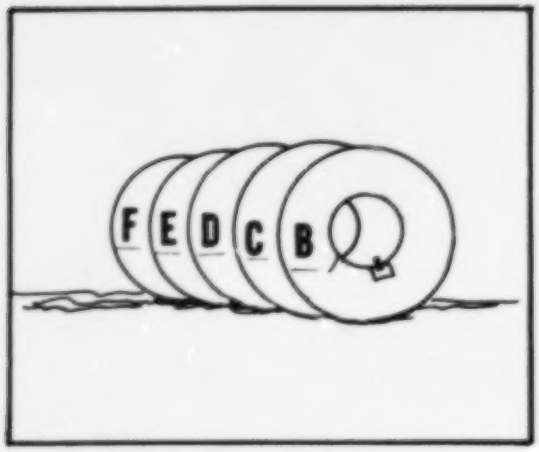
STEP 2 – Be sure the scale is not showing any pressure prior to your use. This could cause a false reading.

STEP 3 – Place circular end of gauge on tire tube A's valve.

STEP 4 – Press gauge down to record measurement.

STEP 5 – Look at extended portion of gauge to read pressure.

STEP 6 – Record finding on checksheet.



STEP 7 – Repeat steps 1 – 6 for tubes B, C, D, E, and F.

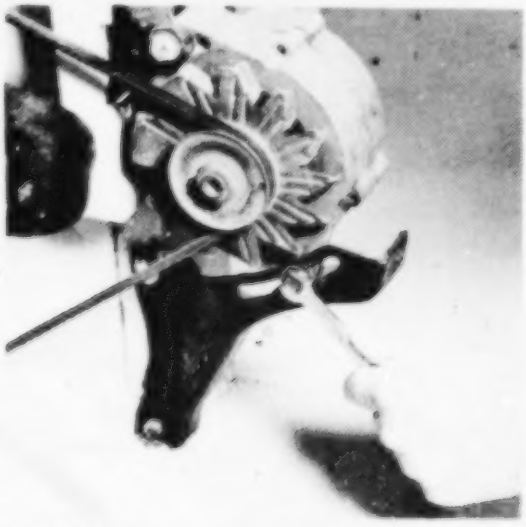
Check Point

When you have recorded all six tube pressures, have your instructor check your checklist.

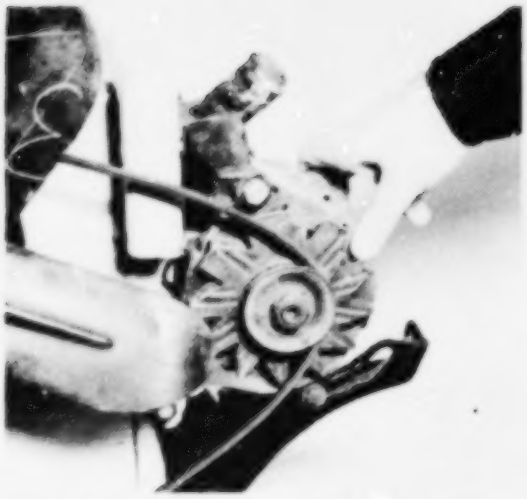
Instructional Objective IX

The student will replace a fan belt.

STEP 1 – Pick up 7/16" open end wrench.



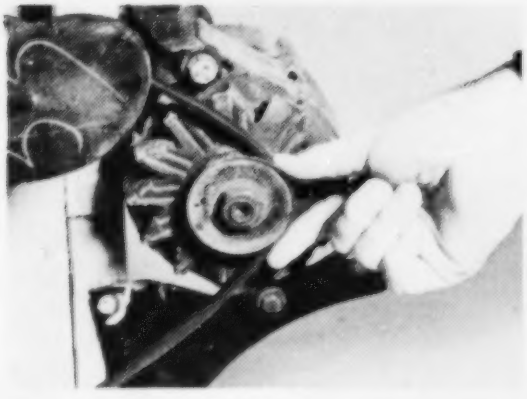
STEP 2 – Loosen nut on generator brace.



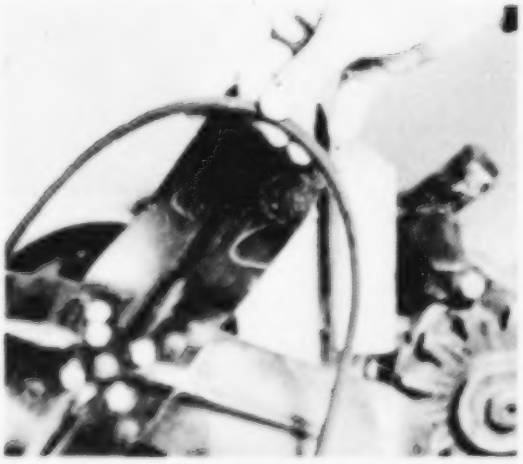
STEP 3 -- Move generator toward fan to loosen the tension on the belt.

STEP 6 – Replace new fan belt by putting it over fan.

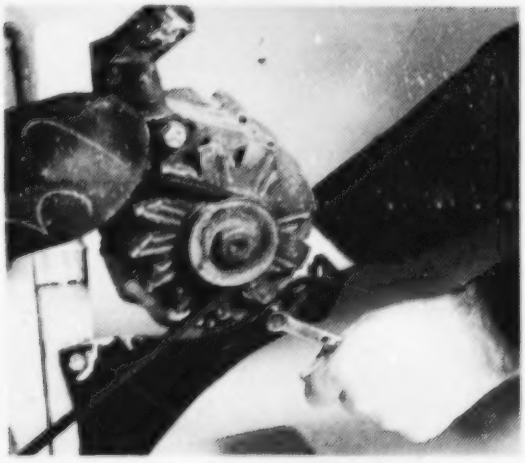
STEP 4 – Remove fan belt by slipping belt off of generator.



STEP 7 – Place new fan belt on slack generator.



STEP 5 – Remove fan belt by slipping it over fan.



STEP 8 – Move generator back until belt is tight, tighten nut on brace.

Check Point

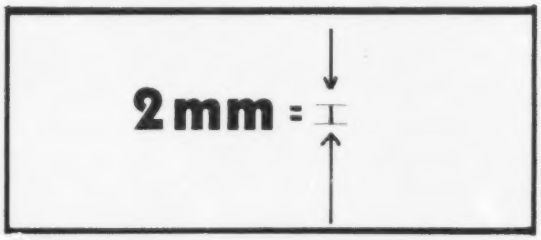
Check to be sure generator has been fastened down tight.

Make sure there is no slack in fan belt.

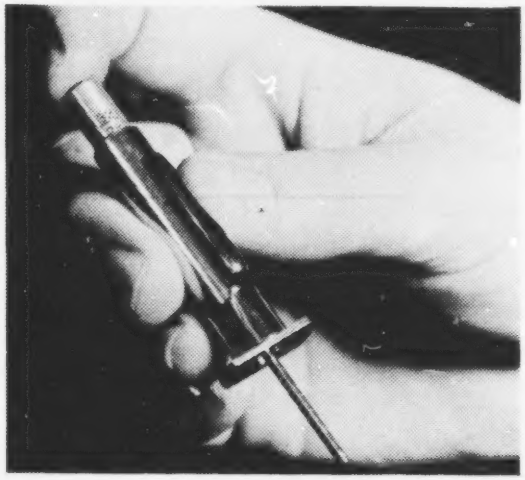
Have instructor check your checksheet and proceed to Objective X.

Instructional Objective X

The student will determine safe tire tread depth and record his/her findings.



STEP 1 – The minimum safe tire tread depth is 2 mm. Anything less than 2 mm is (1/32") is considered unsafe to travel on.



STEP 2 – Pick up the tire tread depth gauge.

STEP 3 – Check your gauge depth pin to see if it slides in and out.

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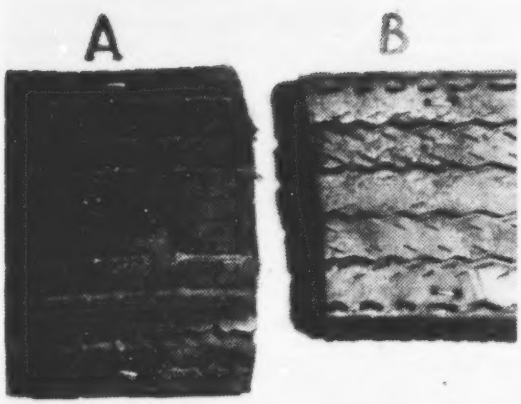
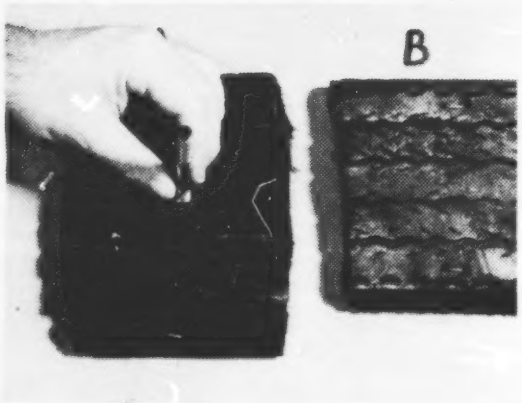
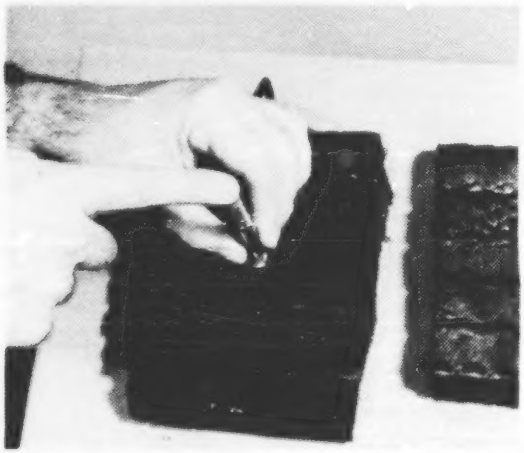


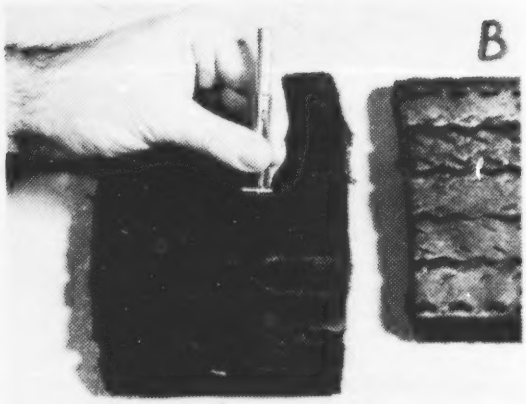
STEP 4 – Go to Letter A on your tire tread board.



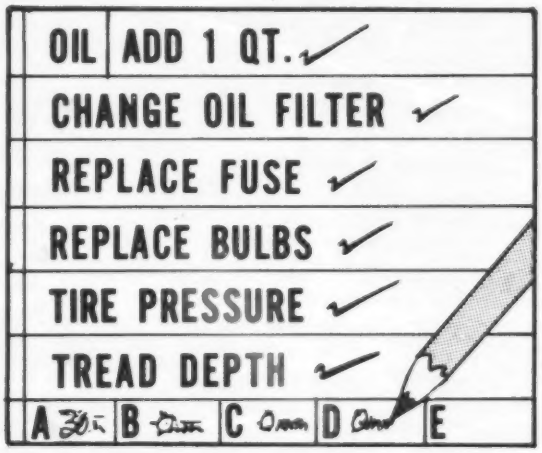
STEP 5 – Place tire tread gauge over one of the grooves in the tire.



STEP 6 – Press pin until it reaches the bottom of the groove.



STEP 7 – Carefully remove the gauge and read the millimeter reading from the shaft of the gauge.



STEP 8 – Record your findings on student checksheet.

Check Point

Repeat steps 5 - 8 until you have recorded all 10 tire readings. Use 2 mm as a safe tire tread depth. Determine which tire treads are safe for vehicle use. Turn in checksheet.

915.467-010 AUTOMOBILE-SERVICE-STATION ATTENDANT (auto ser.) filling-station attendant; gas-station attendant; gas tender; service station attendant.

Services automobiles, buses, trucks, and other automotive vehicles with fuel, lubricants, and accessories: Fills fuel tank of vehicles with gasoline or diesel fuel to level specified by customer. Observes level of oil in crankcase and amount of water in radiator, and adds required amounts of oil and water. Adds necessary amount of water to battery and washes windshield of vehicle. Lubricates vehicle and changes motor oil [LUBRICATION SERVICER (auto ser.)]. Replaces accessories, such as oil filter, air filter, windshield wiper blades, and fan belt. Installs antifreeze and changes spark plugs. Repairs or replaces tires [TIRE REPAIRER (auto. ser.)]. Replaces lights, and washes and waxes vehicle. Collects cash from customer for purchases and makes change or charges purchases, using customer-charge plate. May adjust brakes [BRAKE ADJUSTER (auto. ser.)]. May sell batteries and automobile accessories usually found in service stations. May assist in arranging displays, taking inventories, and making daily reports.

915.477-010 AUTOMOBILE-SELF-SERVE-SERVICE-STATION ATTENDANT (auto. ser.) cashier, automobile services; gasateria attendant; station attendant.

Sells fuel, lubricants, and accessories, at self-service station, to operators of automobiles, buses, trucks, and other automotive vehicles: Allows customer to fill fuel tank of automotive vehicle with fuel, such as gasoline or diesel fuel, to desired level. Checks level of oil in crankcase and amount of water in radiator, and adds oil and water as requested by customer. Collects cash from customer for purchases and makes change or charges purchases, using customer-charge plate. Prepares daily report of fuel, oil, and accessories sold. May lubricate vehicle, change motor oil, and replace accessories, such as oil filter, air filter, windshield wiper blades, and fan belt. May install antifreeze, change spark plugs, make minor brake adjustments, and repair or replace tires. May fill fuel tanks for customers. May service fishing boats and pleasure craft and be designated MARINE-SERVICE-STATION ATTENDANT (water trans.).